

**PROGRAM CHARTER
FOR
Climate and Ecosystems**

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1.EXECUTIVE SUMMARY

Program Description

The objective of the Climate and Ecosystems Program is to understand and predict the consequences of climate variability and change on marine ecosystems. The program accomplishes this by coupling observations with information from retrospective and process studies in order to detect the impacts of climate on marine ecosystems and build an understanding of climate-ecosystem relationships. The goal of the program is to develop forecasts of changes in fishery, coastal, and coral-reef resources in response to climatic changes. The forecasts provide users and managers of ocean and coastal resources information they require to adapt to changing climate regimes.

Changing climate is among the most significant long-term influences on the structure and functioning of marine ecosystems and must therefore be accounted for to insure healthy and productive ocean environments. The National Oceanic and Atmospheric Administration (NOAA) must understand the effects of climate on marine ecosystems in order to meet its responsibilities under numerous mandates regarding the management of living marine and coastal resources. The Climate and Ecosystems Program was created to address this issue by monitoring changes in coastal and marine ecosystems through a network of *in situ* and remote observing systems and by developing biophysical indicators and models that meet the needs of marine resource managers to adapt to predicted climate-induced changes in fishery, coastal, and coral reef resources. The program is intended to be a national program with projects in regions where there are ecologically and economically significant coastal and marine resources impacted by climate variability and change.

This approach is characterized by the North Pacific Climate Regimes and Ecosystem Productivity (NPCREP) project being conducted in the eastern Bering Sea and the Gulf of Alaska, <http://www.st.nmfs.noaa.gov/st7/documents/NPCREP.pdf>. This geographic region was selected for initial climate and ecosystems studies due to its importance for living marine resources (Alaskan fisheries account for approximately 50% of the US commercial fishery landings), climate model predictions that climate change will be most severe at high latitudes, and many indications that environmental conditions are already changing in these regions.

2. PROGRAM REQUIREMENTS

Requirement Drivers

A. Legislative and directive documents establishing needs and requirements

Legislation

- Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1801 et seq.

Mandates that NOAA manage commercial and recreational fishery stocks in the U.S. EEZ and encourages an ecosystem approach to fisheries management.

- Marine Mammal Protection Act, 1 U.S.C. § 1361-1421h. Requires that NOAA manage marine mammal populations.
- Endangered Species Act of 1973, 16 U.S.C. § 1531-1544. Requires that NOAA manage protected marine species.
- Coastal Zone Management Act, 16 U.S.C. § 1451 et seq. Requires NOAA to help States protect and manage coastal ecosystems.
- Marine Protection, Research, and Sanctuaries Act of 1972, Pub. L. No. 92-532, 86 Stat. 1052 (Oct. 23, 1972) (16 U.S.C. § 1431 et seq., § 1447 et seq.; 33 U.S.C. § 1401 et seq., § 2801 et seq.). Directs NOAA to study the long-range effects of pollution, overfishing, and anthropogenic changes of ocean ecosystems.
- Coral Reef Conservation Act of 2000, 16 U.S.C. § 6401 et seq. Requires that NOAA enhance the conservation of coral reefs and address the loss and degradation of U.S. and international coral reef ecosystems.

U. S. Executive Branch and NOAA Directives and Other Guidelines:

- U.S. Ocean Action Plan: Specifies the U.S. should support an integrated approach to oceans management and advance the use of the Large Marine Ecosystems (LME) concept as a tool for enabling ecosystem-based management.

Interagency or International Agreements

- U.S. Climate Change Science Program (CCSP) Strategic Plan (2003): Specifies the need for identifying and quantifying the most important feedbacks between ecological systems and global climate change, the potential consequences of global change on ecological systems, and the options for sustaining and improving ecological systems and related goods and services.

B. Mission Requirements

- Improve management of marine fisheries, marine mammals and protected marine species by accounting for the impacts of climate variability and change on marine systems and their living marine resources. (Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1801 et seq., Marine Mammal Protection Act, 1 U.S.C. § 1361-1421h., Endangered Species Act of 1973, 16 U.S.C. § 1531-1544.)
- Evaluate and provide forecasts of climate variability and change impacts on coastal ecosystems. (Coastal Zone Management Act, 16 U.S.C. § 1451 et seq.)
- Monitor and model changes in coastal eutrophication as a consequence of predicted climate changes in the rate and amount of runoff. (Marine Protection, Research, and Sanctuaries Act of 1972, Pub. L. No. 92-532, 86 Stat. 1052 [Oct. 23, 1972] [16 U.S.C. § 1431 et seq., § 1447 et seq.; 33 U.S.C. § 1401 et seq., § 2801 et seq.].)
- Evaluate climate impacts on coral ecosystems and provide the ability to predict future impacts. (Coral Reef Conservation Act of 2000, 16 U.S.C. § 6401 et seq.)
- Monitor, understand and predict the impacts of global climate change on marine and coastal ecosystems. (Climate Change Science Program Strategic Plan)

3. LINKS TO THE NOAA STRATEGIC PLAN

A. Goal Outcome:

A predictive understanding of the global climate systems on time scales of weeks to decades with quantified uncertainties sufficient for making informed and reasoned decisions.

B. Goal Performance Objective:

Understand and predict the consequences of climate variability and change on marine ecosystems.

C. Goal Strategy:

Develop the ability to predict the consequences of climate change on ecosystems by monitoring changes in coastal and marine ecosystems, conducting research on climate-ecosystem linkages, and incorporating climate information into physical-biological models.

4. PROGRAM OUTCOME

Improved ability to predict the consequences of climate variability and change on ecological systems in order to improve the management of living marine resources.

5. PROGRAM ROLES AND RESPONSIBILITIES

This program is established and managed in accordance with the rules and procedures of the NOAA Business Operations Manual (BOM). Responsibilities of the Program Manager are described in the BOM. Responsibilities of other major participants are summarized below.

A. Participating Line Office, Staff Office, and Council Responsibilities:

1. The NOAA Fisheries Service's Office of Science and Technology is responsible for leading the North Pacific Climate Regimes and Ecosystem Productivity project. Researchers at the Alaska Fisheries Science Center and the NOAA Research Pacific Marine Environmental Laboratory, along with academic partners, conduct the research.

2. The NOAA Ocean Service's National Centers for Coastal Ocean Science (NCCOS) will be responsible for the Coastal Response to Sea-Level Rise project. This project will collect topographic and bathymetric data to provide detailed elevation maps of coastal inundation and provide quantitative models of the ecological responses of the various types of wetlands and shallow water habitats to increases in water depth, salinity, wind waves, and storm surges.

3. The NOAA Satellites and Information's Office of Research and Applications is developing coral bleaching forecasts, which are pertinent to the Climate and Ecosystems Program. Future plans within the Climate and Ecosystems Program include improving the current network of observational sensors and providing integrated forecasts of the time, place and potential severity of coral bleaching events.

4. Councils associated with the Climate and Ecosystems Program include the NOAA Research Council and the NOAA Observing System Council.

5. The NOAA Office of General Counsel is responsible for providing legal services necessary to enable the program to discharge its duties.

6. Coordinate with the Ecosystems Observations program of the Ecosystem Goal on the investigation of physical oceanographic processes that effect long and short term biological productivity in the oceans, particularly for living marine resources.

B. External Agency/Organization Partnerships:

There are no external agencies or organization partnerships that participate in this program.

6. END USERS AND BENEFICIARIES OF PROGRAM

1. Marine Resource Managers (including Fishery Management Councils and Coastal Zone Managers) – This program's goal is to predict the probable effects of climate change on marine systems and the living resources contained therein, and to deliver to marine resource managers the knowledge and tools needed to incorporate climate variability into the management of living marine resources. Thus, the management of billions of dollars of marine resources will be improved.

2. Academia – Academic researchers will be aided in their research by having access to data on the status of marine ecosystems made available by the program. Some will also benefit through receiving extramural research awards to conduct portions of the program.

3. International Programs and Assessment Bodies – The program will benefit international programs such as the Intergovernmental Panel on Climate Change by providing additional data on the impacts of climatic variability on marine ecosystems.

4. Other NOAA programs – The program will benefit the NOAA Fishery Science Centers, NOAA Coastal Zone Management, and other NOAA programs by providing additional data on the status of marine ecosystems.

Appendix A - Secondary Requirement Drivers

Directive documents establishing needs and requirements

- U.S. Commission on Ocean Policy Final Report – An Ocean Blueprint for the 21st Century (2004): Presents a national strategy for conducting research, exploration and marine operations at the federal level, in close partnership with academia and private organizations.
- Pew Oceans Commission Summary Report – America’s Living Oceans: Charting a Course for Sea Change (2003): Outlines a national agenda for protecting and restoring America’s oceans.